CLAIMS

What is claimed is:

1. An automotive vehicle roof system comprising:

a pair of stationary side rails;

a first roof panel being substantially rigid and movably coupled to the rails;

a back window movably coupled to the rails;

a storage compartment positioned adjacent to an end of each of the pair of stationary side rails, the first roof panel being slidable from a closed and functional position to an opened position located in the storage compartment, the back window being movable from a closed and functional position to an opened position located in the storage compartment;

a covering panel movable from a closed position covering the storage compartment to an opened position operable to allow access of the first roof panel and the back window into the storage compartment; and

at least a second roof panel movably coupled to the rails and being slidable from a closed position located between the first roof panel and the back window to an opened position located in the storage compartment;

the first roof panel operably engaging the second roof panel when the first roof panel is retracted and causing the second roof panel to move into and out of the storage compartment substantially simultaneous with the first roof panel; and

the back window operably moving from its closed position to its opened position without requiring simultaneous movement of the first roof panel.

2. The system according to Claim 1, further comprising:

at least one elongated track mounted to the pair of stationary side rails;

a first mechanism slidably coupling the first roof panel to the at least one elongated track; and

a second mechanism slidably coupling the second roof panel to the at least one elongated track.

3. The system according to Claim 2, further comprising:

an electromagnetic device;

a third mechanism including a four-bar linkage slidably coupling the back window to the at least one elongated track; and

an elongated cable operably driven by the electromagnetic device, the cable being attached to the third mechanism in order to move the back window in response to energization of the electromagnetic device.

4. The system according to Claim 1 wherein the first roof panel is rearwardly slidable from a generally inclined venting position to a spoiler position overlapping above the second roof panel when the second roof panel is substantially located in its closed position.

5. The system according to Claim 1 wherein the covering panel is a rigid tonneau cover.

6. An automotive vehicle roof system for an automotive vehicle comprising:

a pair of stationary side rails;

a storage compartment;

a first roof panel movably coupled to the pair of stationary side rails, the first roof panel being substantially rigid and slidable from a closed and functional position to an opened position located in the storage compartment;

a back window movably coupled to the pair of stationary side rails, the back window being movable from a closed and functional position to an opened position located in the storage compartment; and

a second roof panel movably coupled to the pair of stationary side rails, the second roof panel being substantially rigid, separate from the first roof panel, and slidable from a closed position located between the first roof panel and the back window to an opened position located in the storage compartment.

7. The automotive vehicle roof system according to Claim 6, further comprising:

a first elongated track for slidably receiving said first roof panel and said second roof panel, said first elongated track being disposed within at least one of said pair of stationary side rails,

a second elongated track for slidably receiving said back window, said second elongated track being disposed within at least one of said pair of stationary side rails, said second elongated track being separate from said first elongated track.

8. The automotive vehicle roof system according to Claim 7, further comprising:

a first actuator operably coupled to the first roof panel and said second roof panel for actuating said first roof panel and said second roof panel between the closed and functional position and the opened position; and

a second actuator operably coupled to the back window for actuating the back window between the closed and functional position and the opened position.

9. The automotive vehicle roof system according to Claim 8 wherein said first actuator and said second actuator are each positioned below a beltline of the automotive vehicle.

10. The automotive vehicle roof system according to Claim 9, further comprising:

a first continuous cable operably coupled between the first actuator and said first roof panel and said second roof panel, the first continuous cable extending from the first actuator along the first elongated track and back to the first actuator such that said first roof panel and said second roof panel may be actuated solely using a pulling force.

11. The automotive vehicle roof system according to Claim 6, further comprising:

a covering panel movable from a closed position covering the storage compartment to an opened position operable to allow access of the first roof panel, the second roof panel, and the back window into the storage compartment.

12. The automotive vehicle roof system according to Claim 6, further comprising:

at least one elongated track mounted to the pair of stationary side rails;

a first mechanism slidably coupling the first roof panel to the at least one elongated track;

a second mechanism slidably coupling the second roof panel to the at least one elongated track;

a third mechanism including at least a four-bar linkage slidably coupling the back window to the at least one elongated track;

an electromagnetic device; and

an elongated cable operably driven by the electromagnetic device, the cable being attached to the third mechanism in order to move the back window in response to energization of the electromagnetic device.

13. The automotive vehicle roof system according to Claim 6 wherein the first roof panel is rearwardly slidable from a generally inclined venting position to a spoiler position overlapping above the second roof panel when the second roof panel is substantially located in its closed position

14. A roof system for an automotive vehicle, the automotive vehicle defining a generally horizontal plane extending through a beltline of the automotive vehicle, the roof system comprising:

at least one stationary track;

a storage compartment;

a first roof panel slidably coupled to the at least one stationary track, the first roof panel being positionable between a closed position and an opened position located in the storage compartment;

a back window slidably coupled to the at least one stationary track, the back window being movable from a closed and functional position to an opened position located in the storage compartment;

a first actuator operably coupled to the first roof panel for actuating the first roof panel between the closed position and the opened position, the first actuator being positioned below the generally horizontal plane of the automotive vehicle; and

a second actuator operably coupled to the back window for actuating the back window between the closed and functional position and the opened position, the second actuator being positioned below the generally horizontal plane of the automotive vehicle.

15. The roof system according to Claim 14, further comprising:

a first continuous cable operably coupled between the first actuator and the first roof panel, the first continuous cable extending from the first actuator to the first roof panel and back to the first actuator such that the first roof panel may be actuated solely using a pulling force.

16. The roof system according to Claim 14, further comprising:

a covering panel movable from a closed position covering the storage compartment to an opened position operable to allow access of the first roof panel and the back window into the storage compartment

17. The roof system according to Claim 14, further comprising:

a first mechanism slidably coupling the first roof panel to the at least one stationary track;

a second mechanism slidably coupling a second roof panel to the at least one stationary track; and

a third mechanism including at least a four-bar linkage slidably coupling the back window to the at least one stationary track.

18. A method of assemblying a roof system for an automotive vehicle, said automotive vehicle having at least one roof panel and a back window movably coupled to said automotive vehicle, each of said at least one roof panel and said back window being positionable between a closed position and a stowed position, said automotive vehicle defining a horizontal plane about a beltline of the automotive vehicle, said method comprising:

mounting a first drive system to said automotive vehicle at a position below said horizontal plane;

operably coupling said first drive system to said at least one roof panel to move said at least one roof panel between said closed and operational position and said stowed position;

mounting a second drive system to said automotive vehicle at a position below said horizontal plane; and

operably coupling said second drive system to said back window to move said back window between said closed and operational position and said stowed position.

19. The method according to Claim 18 further comprising:

mounting at least one track to said support structure for carrying said at least one roof panel and said back window.

20. The method according to Claim 19 further comprising:

coupling a first mechanism between the first roof panel and the at least one track to enable slidable movement of said first roof panel relative to said at least one track;

coupling a second mechanism between a second roof panel and the at least one track to enable slidable movement of said second roof panel relative to said at least one track; and

coupling at least a four-bar linkage between the back window and the at least one track to enable pivotal movement of the back window.

21. The method according to Claim 18 further comprising:

mounting a first cable between the first drive system and the at least one roof panel, the first cable extending from the first drive system to the at least one roof panel and back to the first drive system such that the at least one roof panel is actuated solely using a pulling force.

22. An automotive vehicle roof system comprising:

a support structure;

a storage compartment;

a back window movably coupled to the support structure, the back window being movable from a closed and functional position to an opened position located in the storage compartment, the back window being made of a generally rigid transparent material;

a covering panel movable from a closed position covering the storage compartment to an opened position operable to allow access of the back window into the storage compartment; and

a sealing member directly fixed to the back window,

wherein the back window is adjacent the covering panel when the back window is in the closed and functional position such that the sealing member engages the covering panel to define a sealing engagement.

23. The automotive vehicle roof system according to Claim 22, further comprising:

a first roof panel movably coupled to the support structure, the first roof panel being substantially rigid and slidable from a closed and functional position to an opened position located in the storage compartment; and

a second roof panel movably coupled to the support structure, the second roof panel being substantially rigid, separate from the first roof panel, and slidable from a closed position located between the first roof panel and the back window to an opened position located in the storage compartment.

24. The automotive vehicle roof system according to Claim 23 wherein said second roof panel is only movably in response to movement of said first roof panel.

25. The automotive vehicle roof system according to Claim 23 wherein the first roof panel is rearwardly slidable from a generally inclined venting position to a spoiler position overlapping above the second roof panel when the second roof panel is substantially located in its closed position

26. The automotive vehicle roof system according to Claim 22, further comprising:

a seal member disposed between the first roof panel and the second roof panel for sealingly engaging the first roof panel and the second roof panel, the seal member having an integrally formed drain trough.

27. The automotive vehicle roof system according to Claim 22 wherein the sealing member is a bulb seal.

28. The automotive vehicle roof system according to Claim 22 wherein the covering panel is a tonneau cover.

29. The automotive vehicle roof system according to Claim 22 wherein said support structure is at least one stationary side rail.